PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-296635
(43)Date of publication of application : 09.10.2002

(51)Int.Cl. G03B 7/08
G03B 7/16
G03B 15/05

(21)Application number : 2001-102346
(22)Date of filing : 30.03.2001

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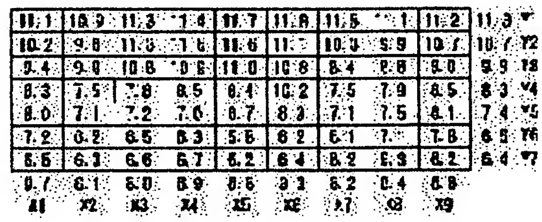
(54) CAMERA

(57)Abstract:
PROBLEM TO BE SOLVED: To allow properly determining a backlight state in a shot scene even at the time of a conventional method can not determine the state.
SOLUTION: A camera has a photometric means 26 for dividing a shot area into a plurality of photometric areas PD11-PD79 expressed by rows × columns and obtaining intensity information per the divided area and a determining means 41 for obtaining a plurality of averaged intensity information by averaging the individual intensity information per the divided area obtained by the photometric means at least in a row or column direction and processing to determine the backlight by using a plurality of the averaged intensity information. When differences between a plurality of the averaged intensity information and the individual intensity information of the divided areas corresponding to focus detecting areas are the predetermined value or more, a backlighted state is determined.



LEGAL STATUS
[Date of request for examination]
[Date of sending the examiner's decision of rejection]
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]
[Date of final disposal for application]
[Patent number]
[Date of registration]
[Number of appeal against examiner's decision of rejection]
[Date of requesting appeal against examiner's decision of rejection]
[Date of extinction of right]

Partial Translation of JPA 2002-296635

[0073]

Then, with reference to the flow chart shown in Figure 6, description will be given of the exposure calculation executed in step (109).

[0074] Step (151)

The camera control circuit 41 receives lens information and the like required to execute the exposure calculation. Then, the camera control circuit 41 corrects digital luminance data (individual luminance information) obtained from the light receiving sections PD11 to PD79 of the photometric sensor 26 in step (108), shown in Figure 5.

[0075] Step (152)

Luminance data corresponding to the rows Y1 to Y7 are calculated from the corrected luminance data obtained from the respective light receiving sections. Specifically, average luminance data for the light receiving sections PD11 to PD19 is calculated as average luminance data for the row Y1. Average luminance data for the light receiving sections PD21 to PD29 is calculated as luminance data for the row Y2. Similar operations are performed to calculate luminance data for the rows Y3 to Y7.

[0076] Step (153)

Luminance data corresponding to the columns X1 to X9 are calculated from the corrected luminance data for the respective light receiving sections. Specifically,

average luminance data for the light receiving sections PD11 to PD71 is calculated as average luminance data for the column X1. Average luminance data for the light receiving sections PD12 to PD72 is calculated as luminance data for the column X2. Similar operations are performed to calculate luminance data for the columns X3 to X9.

[0077]

Figure 7 is a view of the photometric sensor 26 divided into 63 pieces and superimposed on the photographing composition shown in Figure 21. In the description below, it is assumed that in the above photographing situation, data such as that shown in Figure 8 have been obtained as digital individual luminance data obtained from the light receiving sections PD11 to PD79 of the photometric sensor 26 and corrected in step (151).

[0078]

The luminance data shown in Figure 8 are Bv values subjected to an APEX conversion. The individual luminance data obtained from the light receiving section PD11 is Bv = 11.1. The individual luminance data obtained from the light receiving section PD12 is Bv = 10.9. The individual luminance data obtained from the light receiving section PD13 is Bv = 11.3. The other individual luminance data are as shown in Figure 8. The individual luminance data obtained from the light receiving section PD79 is Bv = 6.2.

[0079]

Average luminance data corresponding to the rows Y1 to Y7 are calculated from the individual luminance data for the light receiving sections, shown in Figure 8. Then, Bv = 11.3 for the row Y1 and Bv = 10.7 for the row Y2. The other average luminance data are as shown in Figure 8. Bv = 6.4 for the row Y7.

[0080]

Further, average luminance data corresponding to the columns X1 to X9 are calculated from the individual luminance data obtained from the light receiving sections, shown in Figure 8. Then, Bv = 8.7 for the row X1 and Bv = 8.1 for the column X2. The other average luminance data are as shown in Figure 8. Bv = 8.8 for the column X9.

[0081]

Figure 9 is a horizontal bar graph showing the calculated average luminance data corresponding to the rows Y1 to Y7. Further, Figure 10 is a vertical bar graph showing the calculated average luminance data corresponding to the columns X1 to X9.

[0082] Step (154)

In step (104), information on a focus detection area is loaded. In the photographing composition described in Figure 7, the face area of the person is desirably in focus. Accordingly, the center of the screen, i.e. a part of the object covered by the light receiving section PD45 of the photometric sensor 26 is set as a focus detection area. Then, the corresponding information is loaded.

[0083] Step (155)

The average luminance Bva of the entire photographing screen is calculated on the basis of the individual luminance data obtained from the light receiving sections PD11 to PD79 of the photometric sensor 26.

[0084]

To calculate the average luminance Bva, a simple additive average value may be determined from the individual luminance data obtained from the light receiving sections PD11 to PD79. Alternatively, an additive average value may be determined using a method similar to a center emphasizing average photometric method often used for cameras; luminance data obtained from light receiving sections located close to the center of the screen are more heavily weighted, while luminance data obtained from light receiving sections located around the periphery of the screen are more lightly weighted. Alternatively, the additive average value may be determined by more heavily weighting luminance data obtained from light receiving sections located close to the one corresponding to the focus detection area and inputted in step (154), while more lightly weighting luminance data obtained from light receiving sections located away from the focus detection area.

[0085]

In the present embodiment, the simple additive average value of the individual luminance data shown in Figure 8 is determined. The value obtained is BVa = 8.6.

[0086] Step (156)

A comparison is made between the individual luminance data obtained from the light receiving section (in this case, PD45) set as the focus detection area in step (154) and both the average luminance data corresponding to the rows Y1 to Y7 and the average luminance data corresponding to the columns X1 to X9, the average luminance data being calculated in steps (152) and (153), respectively.

[0087] Step (157)

On the basis of the results of the comparison, it is determined whether or not any of the average luminance data corresponding to the rows Y1 to Y7 and the average luminance data corresponding to the columns X1 to X9 is larger than the individual luminance data obtained from the light receiving section set as the focus detection area, at least by a predetermined amount. If any average luminance data is larger than this individual luminance data at least by the predetermined amount, it is determined that this is a backlight scene. Then, the process proceeds to step (158).

[0088]

Here, if the individual luminance data and average luminance data described in Figure 8 have been obtained, the luminance data obtained from the light receiving section PD45 set as the focus detection area is Bv = 8.4.

[0089]

It is assumed that the predetermined amount used to determine whether or not the scene has been photographed

against the light is, for example, 2. Then, since the average luminance data corresponding to the rows Y1 and Y2 and mainly corresponding to a sky area in the photographing screen are Bv = 11.3 and Bv = 10.7, respectively, these values are larger than the value for the light receiving section PD45, Bv = 8.4, at least by the predetermined amount. Thus, the process proceeds to step (158).

[0090] Step (158)

An exposure correction amount ΔBv corresponding to the backlight scene is calculated. Specifically, the most simplified method is to set uniformly the exposure correction amount ΔBv to be -1.5. Alternatively, a certain function may be used to calculate this value from the largest of the average luminance data corresponding to the rows Y1 to Y7 and the average luminance data corresponding to the columns X1 to X9 as well as the luminance data obtained from the light receiving section set as the focus detection area.

[0091]

An example of the function is shown below.

Exposure correction amount $\Delta Bv = 0.5 \times (Lf - MAX\ (YnXn))$

In this equation, Lf denotes the individual luminance data obtained from the light receiving section set as the focus detection area. MAX (Ynxn) denotes the largest of the average luminance data corresponding to the rows Y1 to Y7 and the average luminance data corresponding to the columns X1 to X9. If it is determined in step (157) that no average luminance data are larger than the individual luminance data

at least by the predetermined amount, then this scene has not been photographed against the light. Accordingly, step (158) is not executed. Therefore, this case is equivalent to the exposure correction amount $\Delta Bv = 0$.

[0092] Step (159)

An object luminance value Bve including a backlight correction is calculated by adding the average luminance value BVa calculated in step (155) and the exposure correction amount ΔBv calculated in step (158) together. That is, the following equation is established:

Object luminance value $Bve = Bva + \Delta Bv$.